

## **BIOPOLYMERS - PLANT-ASSOCIATED BACTERIA AS PHB-PRODUCER**

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Biopolymers are an alternative to petroleum-based polymers. Bacteria are able to produce Polyhydroxybutyrate (PHB), which has properties similar to those of Polypropylen (PP). Therefore it is important to find PHB-producers which cope with industrial demands. Among terrestrial ecosystems, the rhizosphere with its high microbial activity is expected to be a good habitat for PHB-producing bacteria. Indigenous microorganisms must be adapted to changing environmental conditions e.g. fluctuations of nutrient concentrations exuded by plant roots. Inclusion of storage substances is of competitive advantage. In the present study, different plant-associated bacteria were tested on their ability to produce PHBs by applying a multiphasic approach. Using cultivation-dependent techniques, bacterial isolates originated from different plant species and habitats were screened on their ability to form PHBs *in vitro* as well as on the presence of PHB synthase genes using PCR analysis. On the other hand, a cultivation independent method was developed to determine the occurrence of genes for the key enzyme for the synthesis of PHBs within the microbial community of plant habitats. Briefly, the whole community DNA was extracted from rhizospheres, leaves, stems and fruits. By using primer pairs specific for *phaC*, genes of dominant PHB-producers were amplified and separated by single strand conformation polymorphism analysis. Out of the investigated plant habitats the rhizosphere appears to be an excellent source for PHB-accumulating bacteria. A higher number of rhizospheric bacteria were shown to produce PHB *in vitro* or to harbour a PHB-synthase gene compared with the number of isolates from other plant habitats.